AMENDMENTS TO THE CLAIMS

Claim 1 (Currently Amended) An ultra wide band optical transmission system for optically transmitting, via an ultra wide band transmission, one data signal, the ultra wide band optical transmission system comprising:

pulse train generating means for converting the one data signal to a short pulse train, the one data signal being converted based on ~~one~~ an encoding pattern ~~that is~~ uniquely predetermined to correspond ~~corresponding~~ to the one data signal, and for outputting the short pulse train as an ultra wide band transmission;

optical modulating means for converting the one short pulse train output from the pulse train generating means to an optically modulated signal and for outputting the optically modulated signal;

an optical transmission path for transmitting the optically modulated signal ~~that is~~ output from the optical modulating means;

optical detecting means for converting the optically modulated signal transmitted on the optical transmission path to an electrical signal and for outputting the electrical signal; and

data signal extracting means for (i) obtaining the short pulse train from the electrical signal ~~that is~~ output from the optical detecting means, the short pulse train being obtained based on a decoding pattern that uniquely corresponds to the encoding pattern, and (ii) extracting the one data signal from the short pulse train.

Claims 2-4 (Canceled)

Claim 5 (Currently Amended) The ultra wide band optical transmission system according to claim 1, wherein:

~~wherein~~ the pulse train generating means comprises a pulse train generating portion for converting the one data signal ~~input to a~~ the short pulse train based on the predetermined encoding pattern, and for outputting the short pulse train as an ultra wide band transmission~~, and~~;

the optical modulating means comprises an optical modulating portion for converting the short pulse train output from the pulse train generating portion to an optically intensity modulated signal and for outputting the optically intensity modulated signal; ~~signal,~~

the optical transmission system further comprises a pulse compressing portion for (i) receiving the optically intensity modulated signal transmitted on ~~in~~ the optical transmission path, (ii) compressing a pulse width of ~~a~~ the short pulse train, which is modulation information, or reducing a rising time and/or a falling time of the short pulse train, and (iii) outputting a result as an optical signal; and ~~result,~~

~~wherein~~ the optical detecting means further comprises ~~comprises:~~

~~———————~~ an optical detecting portion for converting ~~an~~ the optical signal output from the pulse compressing portion to an electrical signal and for outputting the electrical signal.

Claim 6 (Currently Amended) The ultra wide band optical transmission system according to claim 1, wherein:

~~wherein~~ the pulse train generating means further comprises:

a pulse train generating portion for converting the one data signal ~~input to a~~ the short pulse train based on the predetermined encoding pattern, and for outputting the short pulse train as an ultra wide band transmission [[,]]; and

a filter portion for (i) increasing a pulse width of the short pulse train output from the pulse train generating portion, or increasing a rising time and/or a falling time of the short pulse train output from the pulse train generating portion, and (ii) outputting a result as the short pulse train; ~~result,~~

the optical modulating means comprises an optical modulating portion for converting the short pulse train output from the filter portion to an optically intensity modulated signal and for outputting the optically intensity modulated signal; ~~signal,~~

the optical transmission system further comprises a pulse compressing portion for (i) receiving the optically intensity modulated signal transmitted ~~in~~ on the transmission path, (ii) compressing a pulse width of ~~a~~ the short pulse train, which is modulation information, or reducing a rising time and/or a falling time of the short pulse train, and (iii) outputting a result as an optical signal; and ~~result,~~

~~wherein~~ the optical detecting means ~~comprises:~~ further comprises

————————an optical detecting portion for converting ~~an~~ the optical signal output from the pulse compressing portion to an electrical signal and for outputting the electrical signal.

Claim 7 (Currently Amended) The ultra wide band optical transmission system according to claim 1, wherein:

~~wherein~~ the pulse train generating means comprises a pulse train generating portion for converting the one data signal ~~input to a~~ the short pulse train based on the predetermined encoding pattern, and for outputting the short pulse train as an ultra wide band transmission;~~, and~~

the optical modulating means comprises an optical angle modulating portion for converting the short pulse train output from the pulse train generating portion to an optically angle modulated signal and for outputting the optically angle modulated signal; and ~~signal,~~

the optical detecting means comprises:

an optical interference portion for (i) receiving the ~~an~~ optically angle modulated signal transmitted on the optical transmission path and (ii) detecting a correlation between adjacent bits of ~~a~~ the short pulse train, which is modulation information, so as to output two optical differential signals ~~that have~~ having opposite polarities to each other and corresponding ~~correspond~~ to differential components of the short pulse train~~, and~~; and

an optical detecting portion for converting one of the optical differential signals ~~that are~~ output from the optical interference portion to an electrical signal and for outputting the electrical signal.

Claims 8 (Currently Amended) The ultra wide band optical transmission system according to claim 7, wherein the optical interference portion comprises:

an optical splitting portion for splitting the received ~~input~~ optically angle modulated signal into two optically angle modulated signals[[,]];

an optical delay portion for supplying a predetermined optical delay ~~amount~~ to one or both of the optically angle modulated signals that are split and output from the optical splitting portion and for outputting a result[[,]]; and

an optical combining/splitting portion for combining (i) another of the optically angle modulated signals that is split ~~the other optically angle modulated signal that is split~~ and output from the optical splitting portion and (ii) an optically angle modulated signal that is output from

the optical delay portion, and for splitting the combined signals ~~a result~~ into two signals ~~again~~ so as to output optical differential signals having opposite polarities to each other.

Claim 9 (Currently Amended) The ultra wide band optical transmission system according to claim 8, wherein the predetermined optical delay ~~amount~~ is smaller than one bit width of the short pulse train.

Claim 10 (Currently Amended) The ultra wide band optical transmission system according to claim 1, wherein:

~~wherein~~ the pulse train generating means comprises a pulse train generating portion for converting the one data signal ~~input to a~~ the short pulse train based on the predetermined encoding pattern, and for outputting the short pulse train as an ultra wide band transmission; ~~and~~

the optical modulating means comprises an optical angle modulating portion for converting the short pulse train output from the pulse train generating portion to an optically angle modulated signal and for outputting the optically angle modulate signal; and ~~signal,~~

the optical detecting means comprises:

an optical interference portion for (i) receiving ~~an~~ the optically angle modulated signal transmitted on the optical transmission path and (ii) detecting a correlation between adjacent bits of ~~a~~ the short pulse train, which is modulation information, so as to output two optical differential signals that have opposite polarities to each other and correspond to differential components of the short pulse train ~~, and~~; and

an optical balance detecting portion for reconverting the two optical differential signals ~~that are~~ output from the optical interference portion to respective electrical signals and for combining the two electrical signals so as to generate and output a short bipolar differential pulse train.

Claim 11 (Currently Amended) The ultra wide band optical transmission system according to claim 10, wherein the optical interference portion comprises:

an optical splitting portion for splitting the received ~~input~~ optically angle modulated signal into two optically angle modulated signals; ~~two,~~

an optical delay portion for supplying a predetermined optical delay ~~amount~~ to one or both of the optically angle modulated signals that are split and output from the optical splitting portion and for outputting a result; and~~, and~~

an optical combining/splitting portion for combining (i) another of the optically angle modulated signals that is split ~~the other optically angle modulated signal that is split~~ and output from the optical splitting portion and (ii) an optically angle modulated signal that is output from the optical delay portion, and for splitting the combined signals ~~a result~~ into two signals ~~again~~ so as to output optical differential signals having opposite polarities to each other.

Claim 12 (Currently Amended) The ultra wide band optical transmission system according to claim 11, wherein the predetermined optical delay ~~amount~~ is smaller than one bit width of the short pulse train.

Claim 13 (Currently Amended) The ultra wide band optical transmission system according to claim 10, wherein the optical balance detecting portion comprises:

a first optical detecting portion for reconverting one of the optical differential signals ~~that are~~ output from the optical interference portion to a first short differential pulse train, which is an electrical signal, and for outputting the first short differential pulse train as an electrical signal;

a second optical detecting portion for reconverting another of the ~~other~~ optical differential signals ~~signal that is~~ output from the optical interference portion to a second short differential pulse train, which is an electrical signal, and for outputting the second short differential pulse train as an electrical signal;

a delay portion for supplying a predetermined electrical delay ~~amount~~ to (i) the first short differential pulse train output from the first optical detecting portion, and/or (ii) the second short differential pulse train output from the second optical detecting portion and for outputting a result; and

a combining portion for combining the first short differential pulse train and the second short differential pulse train output from the delay portion to output a short bipolar differential pulse train.

Claim 14 (Currently Amended) The ultra wide band optical transmission system according to claim 10, wherein:

the optical interference portion comprises:

an optical splitting portion for splitting the received ~~input~~ optically angle modulated signal into two optically angle modulated signals; ~~two,~~

an optical delay portion for supplying a predetermined optical delay ~~amount~~ to one or both of the optically angle modulated signals that are split and output from the optical splitting portion and for outputting a result~~, and~~; and

an optical combining/splitting portion for combining (i) another of the optically angle modulated signals that is split ~~the other optically angle modulated signal that is split~~ and output from the optical splitting portion and (ii) an optically angle modulated signal that is output from the optical delay portion, and for splitting the combined signals ~~a result~~ into two signals ~~again~~ so as to output optical differential signals having opposite polarities to each ~~other,~~ other; and

~~wherein~~ the optical balance detecting portion comprises:

a first optical detecting portion for reconverting one of the optical differential signals ~~that are~~ output from the optical interference portion to a first short differential pulse train, which is an electrical signal, and for outputting the first short differential pulse train as an electrical signal;

a second optical detecting portion for reconverting another of the ~~other~~ optical differential signals ~~signal that is~~ output from the optical interference portion to a second short differential pulse train, which is an electrical signal, and for outputting the second short differential pulse train as an electrical signal;

a delay portion for supplying a predetermined electrical delay ~~amount~~ to (i) the first short differential pulse train output from the first optical detecting portion, and/or (ii) the second short differential pulse train output from the second optical detecting portion and for outputting a result; and

a combining portion for combining the first short differential pulse train and the second short differential pulse train output from the delay portion to output a short bipolar differential pulse train.

Claim 15 (Currently Amended) The ultra wide band optical transmission system according to claim 14, wherein the predetermined electrical delay ~~amount~~ is equal to the predetermined optical delay ~~amount~~.

Claim 16 (Currently Amended) The ultra wide band optical transmission system according to claim 1, wherein:

the pulse train generating means comprises a pulse train generating portion for converting the one data signal ~~input~~ to ~~a~~ the short pulse train based on the predetermined encoding pattern, and for outputting the short pulse train as an ultra wide band transmission; ~~, and~~

the optical modulating means comprises an optical modulating portion for converting the short pulse train output from the pulse train generating portion to an optically intensity modulated signal and for outputting the optically intensity modulated signal; ~~signal,~~

the optical transmission system further comprises a wavelength dispersing portion ~~that~~ which (i) has wavelength dispersion characteristics, (ii) ~~and~~ receives the optically intensity modulated signal transmitted on the optical transmission path, (iii) compresses a pulse width of ~~a~~ the short pulse train or a synthesized signal, which is modulation information, or reduces a rising time and/or a falling time of the short pulse train, and (iv) outputs ~~outputting~~ a result as an optical signal; and ~~result,~~

~~wherein~~ the optical detecting means further comprises ~~comprises:~~

——————an optical detecting portion for converting ~~an~~ the optical signal output from the wavelength dispersing portion to an electrical signal and for outputting the electrical signal.

Claim 17 (Currently Amended) The ultra wide band optical transmission system according to claim 16, wherein the optical modulating portion uses a directly optical modulation scheme in which a current injected to a semiconductor laser is modulated with ~~an input~~ a received short pulse train to output an optically intensity modulated signal.

Claim 18 (Currently Amended) An ultra wide band optical transmission system for optically transmitting, via an ultra wide band transmission, at least two data signals, the ultra wide band optical transmission system comprising:

pulse train generating means for converting ~~the at least two~~ each data signal ~~signals~~ to a respective short pulse train ~~trains~~, each data signal being converted based on ~~at least two~~ a respective encoding pattern ~~patterns that are~~ uniquely predetermined to correspond ~~corresponding~~ to ~~the at least two~~ a respective data signal ~~signals~~, and for outputting the short pulse trains;

optical modulating means for converting the ~~at least two~~ short pulse trains output from the pulse train generating means to optically modulated signals and for outputting the optically modulated signals;

an optical transmission path for transmitting the optically modulated signals ~~that are~~ output from the optical modulating means;

optical detecting means for converting the optically modulated signals transmitted on the optical transmission path to electrical signals and for outputting the electrical signals; and

data signal extracting means for (i) obtaining the short pulse trains from the electrical signals ~~that are~~ output from the optical detecting means, the short pulse trains being obtained based on decoding patterns that uniquely correspond to the respective encoding patterns, and (ii) extracting the data signals from the short pulse trains.

Claim 19 (Currently Amended) The ultra wide band optical transmission system according to claim 18, wherein:

~~wherein~~ the pulse train generating means comprises a plurality of pulse train generating portions for (i) converting ~~a plurality of~~ the data signals to respective short pulse trains ~~that are~~ of predetermined modulation types, the converting being based on encoding patterns, each of which is predetermined to correspond ~~corresponding~~ to the data signals ~~input~~ and is different from one another, and (ii) outputting the short pulse trains as an ultra wide band transmission ~~train, and~~; and

~~wherein~~ the optical modulating means comprises:

a plurality of optical modulating portions, each optical modulating portion (i) ~~that are provided~~ corresponding to a pulse train generating portion of the pulse train generating portions, (ii) for converting each ~~and convert the~~ short pulse train ~~trains~~ output from a corresponding ~~the respective~~ pulse train generating portion ~~portions~~ to a respective optically

modulated signal ~~signals~~ and (iii) for outputting the respective optically modulated signal ~~signals, and~~; and

an optical combining portion for combining the optically modulated signals output from the plurality of optical modulating portions and for outputting a result to the optical transmission path as combined optically modulated signals.

Claim 20 (Currently Amended) The ultra wide band optical transmission system according to claim 19, wherein:

the optical detecting means comprises an optical detecting portion for reconverting the combined optically modulated signals transmitted on the optical transmission path to electrical signals and outputting the electrical signals~~, and~~; and

the data signal extracting means comprises a demodulating/separating portion for extracting the short pulse trains from the electrical signals ~~that are~~ output from the optical detecting portion based on decoding patterns that uniquely correspond to the ~~plurality of~~ respective encoding patterns and for demodulating the data signals.

Claim 21 (Currently Amended) The ultra wide band optical transmission system according to claim 19, wherein:

the optical detecting means comprises:

an optical splitting portion for splitting the combined optically modulated signals ~~signal~~ transmitted on the optical transmission path to a plurality of optically modulated signals and for outputting the plurality of optically modulated signals~~, and~~; and

a plurality of optical detecting portions, each optical detecting portion (i) ~~that are provided~~ corresponding respectively to an optically modulated signal of the plurality of optically modulated signals ~~that are~~ split and output by the optical splitting portion, (ii) reconverting ~~and reconvert~~ the corresponding optically modulated signal ~~signals~~ to an electrical signal ~~signals~~, and (iii) outputting ~~to output~~ the electrical signal ~~signals, and~~; and

~~wherein~~ the data signal extracting means comprises a plurality of demodulating/separating portions, each (i) ~~portion that are provided~~ corresponding respectively to an optical detecting portion of the plurality of optical detecting portions, (ii) extracting a ~~and extract the~~ respective short pulse train ~~trains~~ from a respective ~~the~~ electrical signal ~~signals that~~

~~are~~ output from the corresponding optical detecting portion based on a decoding pattern ~~patterns~~ that uniquely corresponds ~~correspond~~ to a respective encoding pattern of the plurality of encoding patterns, and (iii) demodulating ~~demodulate the~~ a respective data signal ~~signals~~.

Claim 22 (Currently Amended) The ultra wide band optical transmission system according to claim 19, further comprising a data optical modulating portion for converting a data signal having a lower rate than a repetitive cycle of short pulse trains output from the plurality of pulse train generating portions to an optically modulated signal and for outputting the optically modulated signal, wherein:

~~wherein~~ the optical combining portion further combines the optically modulated ~~data~~ signal output from the data optical modulating portion~~, and~~; and

the data signal extracting means comprises:

_____a data separating portion for outputting the electrical signals output from the optical detecting means, the output electrical signals being ~~portion~~ separated into the data signal having a lower rate than the repetitive cycle of the short pulse train and other synthesized signals ~~(synthesized signal), and~~; and

_____a demodulating/separating portion for extracting the short pulse trains from the synthesized signal output from the data separating portion based on decoding patterns that uniquely correspond to ~~a plurality of the~~ respective encoding patterns and for demodulating the data signals.

Claim 23 (Currently Amended) The ultra wide band optical transmission system according to claim 19, further comprising a wavelength control portion for controlling ~~such that~~ wavelengths of optically modulated signals output from the plurality of optical modulating portions such that the wavelengths do not overlap each other.

Claim 24 (Currently Amended) The ultra wide band optical transmission system according to claim 18, wherein:

~~wherein~~ the pulse train generating means comprises a plurality of pulse train generating portions for (i) converting ~~the plurality of the input~~ data signals to respective short pulse trains ~~that are~~ of predetermined modulation types, the converting being based on the encoding patterns,

each of which is predetermined to correspond ~~corresponding~~ to the ~~input~~ data signals ~~signal~~ and is different from one another, and (ii) outputting the short pulse trains as an ultra wide band transmission ~~train, and~~; and

~~wherein~~ the optical modulating means comprises:

a synthesizing portion for outputting an electrical signal obtained by synthesizing short pulse trains output from the plurality of pulse train generating portions~~, and~~; and

an optical modulating portion for converting the electrical signal output from the synthesizing portion to an optically modulated signal and for outputting the optically modulated signal.

Claims 25-27 (Canceled)

Claim 28 (Currently Amended) The ultra wide band optical transmission system according to claim 24, wherein:

the synthesizing portion further synthesizes a data signal having a lower rate than a repetitive cycle of the short pulse trains output from the plurality of pulse train generating portions; ~~portions,~~

~~wherein~~ the optical detecting means comprises:

an optical splitting portion for splitting the optically modulated signal transmitted on the optical transmission path to a plurality of optically modulated signals and for outputting the plurality of optically modulated signals; ~~signals,~~

a plurality of optical detecting portions, each optical detecting portion (i) ~~that are provided~~ corresponding respectively to an optically modulated signal of the plurality of optically modulated signals ~~that are~~ split and output by the optical splitting portion, (ii) ~~and reconvert~~ reconverting the corresponding optically modulated signal ~~signals~~ to an electrical signal ~~signals~~, and (iii) outputting ~~outputs~~ the electrical signal ~~signals, and~~; and

a data optical detecting portion for reconverting one of the optically modulated signals of the plurality of optically modulated signals ~~that are~~ split and output by the optical splitting portion to a data signal having a lower rate than the repetitive cycle of the short pulse trains output from the plurality of pulse train generating portions and for outputting the data signal having the lower rate; and ~~signal,~~

~~wherein~~ the data signal extracting means comprises a plurality of demodulating/separating portions, each demodulating/separating portion (i) ~~that are provided~~ corresponding respectively to an optical detecting portion of the plurality of optical detecting portions, (ii) extracting a respective ~~and extract the~~ short pulse train ~~trains~~ from a respective ~~the~~ electrical signal ~~signals that are~~ output from the corresponding optical detecting portion based on a decoding pattern ~~patterns~~ that uniquely corresponds ~~correspond~~ to a respective encoding pattern of the plurality of encoding patterns, and (iii) demodulating a ~~demodulate the~~ respective data signal ~~signals~~.

Claim 29 (Currently Amended) The ultra wide band optical transmission system according to claim 24, further comprising a pulse compressing portion for receiving ~~the~~ an optically intensity modulated signal transmitted on ~~in~~ the optical transmission path, for compressing ~~a~~ the pulse width of a short pulse train, which is modulation information, or reducing a rising time and/or a falling time of the short pulse train, and for outputting a result as an optical signal,

wherein the optical detecting means comprises:

an optical detecting portion for converting ~~an~~ the optical signal output from the pulse compressing portion to an electrical signal and for outputting the electrical signal.

Claim 30 (Currently Amended) The ultra wide band optical transmission system according to claim 24, further comprising:

a filter portion ~~that is~~ provided between ~~each of~~ the short pulse train generating portions and the synthesizing portion and for increasing ~~increases~~ a pulse width of each short ~~the~~ pulse train output from the pulse train generating portions ~~portion~~, or increasing ~~increases~~ a rising time and/or a falling time of ~~the~~ each short pulse train output from the pulse train generating portions and for outputting ~~outputs~~ a result ~~, and~~; and

a pulse compressing portion for receiving ~~the~~ an optically intensity modulated signal transmitted on ~~in~~ the optical transmission path, for compressing a pulse width of a short pulse train, which is modulation information, or reducing a rising time and/or a falling time of the short pulse train, and for outputting a result,

wherein the optical detecting means comprises:

———————an optical detecting portion for converting an optical signal output from the pulse compressing portion to an electrical signal and for outputting the electrical signal.

Claim 31 (Currently Amended) The ultra wide band optical transmission system according to claim 24, wherein:

~~wherein~~ the optical modulating portion is an optical angle modulating portion for converting the short pulse trains ~~train~~ output from the pulse train generating portions ~~portion~~ to an optically angle modulated signal and for outputting the optically angle modulated signal~~, and~~; and

the optical detecting means comprises:

an optical interference portion for receiving an optically angle modulated signal transmitted on the optical transmission path and for detecting a correlation between adjacent bits of a short pulse train, which is modulation information, so as to output two optical differential signals ~~that have~~ having opposite polarities to each other and corresponding ~~correspond~~ to differential components of the short pulse train~~, and~~; and

an optical detecting portion for converting one of the optical differential signals ~~that are~~ output from the optical interference portion to an electrical signal and outputting the electrical signal.

Claim 32 (Currently Amended) The ultra wide band optical transmission system according to claim 31, wherein the optical interference portion comprises:

an optical splitting portion for splitting the received ~~input~~ optically angle modulated signal into two optically angle modulated signals; ~~two,~~

an optical delay portion for supplying a predetermined optical delay ~~amount~~ to one or both of the optically angle modulated signals that are split and output from the optical splitting portion and for outputting a result~~, and~~; and

an optical combining/splitting portion for combining (i) another of the optically angle modulated signals that is split ~~the other optically angle modulated signal that is split~~ and output from the optical splitting portion and (ii) an optically angle modulated signal that is output from the optical delay portion, and for splitting the combined signals ~~a result~~ into two signals ~~again~~ so as to output optical differential signals having opposite polarities to each other.

Claim 33 (Currently Amended) The ultra wide band optical transmission system according to claim 32, wherein the predetermined optical delay ~~amount~~ is smaller than one bit width of the short pulse train.

Claim 34 (Currently Amended) The ultra wide band optical transmission system according to claim 24, wherein:

the optical modulating portion is an optical angle modulating portion for converting the short pulse trains ~~train~~ output from the pulse train generating portions ~~portion~~ to an optically angle modulated signal and for outputting the optically angle modulated signal; and ~~signal,~~

the optical detecting means comprises:

an optical interference portion for receiving an optically angle modulated signal transmitted on the optical transmission path and for detecting a correlation between adjacent bits of a short pulse train, which is modulation information, so as to output two optical differential signals ~~that have~~ having opposite polarities to each other and corresponding ~~correspond~~ to differential components of the short pulse train~~, and~~; and

an optical balance detecting portion for reconverting the two optical differential signals ~~that are~~ output from the optical interference portion to respective electrical signals and for combining the two respective electrical signals ~~so as~~ to generate and output a short bipolar differential pulse train.

Claim 35 (Currently Amended) The ultra wide band optical transmission system according to claim 34, wherein the optical interference portion comprises:

an optical splitting portion for splitting the ~~input~~ received optically angle modulated signal into two optically angle modulated signals; ~~two,~~

an optical delay portion for supplying a predetermined optical delay ~~amount~~ to one or both of the optically angle modulated signals that are split and output from the optical splitting portion and for outputting a result~~, and~~; and

an optical combining/splitting portion for combining (i) another of the optically angle modulated signals that is split ~~the other optically angle modulated signal that is split~~ and output from the optical splitting portion and (ii) an optically angle modulated signal that is output from

the optical delay portion, and for splitting the combined signals ~~a result~~ into two signals again so as to output optical differential signals having opposite polarities to each other.

Claim 36 (Currently Amended) The ultra wide band optical transmission system according to claim 35, wherein the predetermined optical delay ~~amount~~ is smaller than one bit width of the short pulse train.

Claim 37 (Currently Amended) The ultra wide band optical transmission system according to claim 34, wherein:

the optical balance detecting portion comprises:

a first optical detecting portion for reconverting one of the optical differential signals ~~that are~~ output from the optical interference portion to a first short differential pulse train, which is an electrical signal, and for outputting the first short differential pulse train as an electrical signal; and

a second optical detecting portion for reconverting another of the ~~other~~ optical differential signals ~~signal that is~~ output from the optical interference portion to a second short differential pulse train, which is an electrical signal, and for outputting the second short differential pulse train as an electrical signal;

a delay portion for supplying a predetermined electrical delay ~~amount~~ to (i) the first short differential pulse train output from the first optical detecting portion, and/or (ii) the second short differential pulse train output from the second optical detecting portion and for outputting a result; and

a combining portion for combining the first short differential pulse train and the second short differential pulse train output from the delay portion to output a short bipolar differential pulse train.

Claim 38 (Currently Amended) The ultra wide band optical transmission system according to claim 34, wherein:

the optical interference portion comprises:

an optical splitting portion for splitting the ~~input~~ received optically angle modulated signal into two optically angle modulated signals; ~~two,~~

an optical delay portion for supplying a predetermined optical delay ~~amount~~ to one or both of the optically angle modulated signals that are split and output from the optical splitting portion and for outputting a result~~, and~~; and

an optical combining/splitting portion for combining (i) another of the optically angle modulated signals that is split ~~the other optically angle modulated signal that is split~~ and output from the optical splitting portion and (ii) an optically angle modulated signal that is output from the optical delay portion, and for splitting the combined signals ~~a result~~ into two signals ~~again~~ so as to output optical differential signals having opposite polarities to each other; and ~~other,~~

~~wherein~~ the optical balance detecting portion comprises:

a first optical detecting portion for reconverting one of the optical differential signals ~~that are~~ output from the optical interference portion to a first short differential pulse train, which is an electrical signal, and for outputting the first short differential pulse train as an electrical signal;

a second optical detecting portion for reconverting another of the ~~other~~ optical differential signals ~~signal that is~~ output from the optical interference portion to a second short differential pulse train, which is an electrical signal, and for outputting the second short differential pulse train as an electrical signal;

_____a delay portion for supplying a predetermined electrical delay ~~amount~~ to (i) the first short differential pulse train output from the first optical detecting portion, and/or (ii) the second short differential pulse train output from the second optical detecting portion and for outputting a result; and

_____a combining portion for combining the first short differential pulse train and the second short differential pulse train output from the delay portion to output a short bipolar differential pulse train.

Claim 39 (Currently Amended) The ultra wide band optical transmission system according to claim 38, wherein the predetermined electrical delay ~~amount~~ is equal to the predetermined optical delay ~~amount~~.

Claim 40 (Currently Amended) The ultra wide band optical transmission system according to claim 24, wherein:

~~wherein~~ the optical modulating portion converts the short pulse trains ~~train~~ output from the pulse train generating portions ~~portion~~ to an optically intensity modulated signal and outputs the optically intensity modulated signal; ~~signal,~~

the optical transmission system further comprises a wavelength dispersing portion, which (i) ~~that~~ has wavelength dispersion characteristics ~~and~~, (ii) receives the optically intensity modulated signal transmitted on the optical transmission path, (iii) compresses a pulse width of a short pulse train or a synthesized signal, which is modulation information, or reduces a rising time and/or a falling time of the short pulse train, and (iv) outputs ~~outputting~~ a result; and ~~result,~~

~~wherein~~ the optical detecting means comprises~~:~~

~~———————~~ an optical detecting portion for converting an optical signal output from the wavelength dispersing portion to an electrical signal and for outputting the electrical signal.

Claim 41 (Currently Amended) The ultra wide band optical transmission system according to claim 40, wherein the optical modulating portion uses a directly optical modulation scheme in which a current injected to a semiconductor laser is modulated with ~~an input~~ a received short pulse train to output an optically intensity modulated signal.

Claim 42 (Currently Amended) The ultra wide band optical transmission system according to claim 1, wherein a modulation type of a short pulse train converted by the pulse train generating means is a pulse position modulation type.

Claim 43 (Canceled)

Claim 44 (Currently Amended) ~~A~~ An ultra wide band transmitter apparatus for optically transmitting, via an ultra wide band transmission, at least one data signal, the ultra wide band transmitter apparatus comprising:

pulse train generating means for converting each ~~of the at least one~~ data signal, respectively, to a short pulse train, each short pulse train being obtained based on at least one encoding pattern ~~that is~~ uniquely predetermined to correspond ~~corresponding~~ to the respective ~~at~~

~~least one~~ data signal, and for outputting ~~the~~ each short pulse train as an ultra wide band transmission; and

optical modulating means for converting ~~the~~ at least one short pulse train output from the pulse train generating means to an optically modulated signal and for outputting the optically modulated signal ~~to~~ on an optical transmission path.

Claim 45 (Currently Amended) ~~A~~ An ultra wide band receiver apparatus for receiving, via an ultra wide band transmission on an optical transmission path, an optically modulated signal ~~that has been~~ modulated with a short pulse train obtained by converging at least one data signal, the short pulse train being obtained based on at least one encoding pattern ~~that is~~ uniquely predetermined to correspond ~~corresponding~~ to the at least one data signal~~, via an optical transmission path~~, the ultra wide band receiver apparatus comprising:

optical detecting means for converting the optically modulated signal transmitted on the optical transmission path to an electrical signal and for outputting the electrical signal; and

data signal extracting means for (i) obtaining the short pulse train from the electrical signal ~~that is~~ output from the optical detecting means, the short pulse train being obtained based on a decoding pattern that uniquely corresponds to the encoding pattern, and (ii) extracting the at least one data signal from the short pulse train.